Propellant Charge

The invention relates to propellant charges for weapons-training systems.

Propellant charges for projectiles generally consist of substances of high energy content, such as nitrocellulose, or more thermally stable systems such those developed and used for vehicle safety in the form of air-bag gas generators. These versions are rich in gas and generate the energy needed to produce the projectile motion by rapid and nearly complete decomposition. This is expressed thermodynamically by the oxygen balance, the specific energy or the heat of explosion. Such versions are of limited suitability for weapons systems, because the accelerate the practice projectile too strongly.

The propellant charge according to the invention contains, aside from heavy-metal-free priming materials, which are themselves common, friction agents and preferably no oxidizing or reducing agents. The friction agent acts simultaneously as an inert diluent, and is not a component of the reaction. Friction agents which do not exert any abrasive action on weapons (soft friction agents) can be used as friction agents according to the invention. Examples of friction agents include marble, calcite, dolomite and/or soft carbonates such as magnesium carbonate and/or calcium carbonate. Mixtures of soft friction agents can also be used according to the invention. Other ordinary friction agents can optionally also be added in the usual proportions to the propellant charge according to the invention. Impact-sensitive explosives are used as the heavy-metal-free primer materials. Potassium dinitrobenzofuroxanate and tetrazene are examples. The uses of potassium dinitrobenzofuroxanate and tetrazene as components of heavy-metal-free priming mixtures are known, but mostly in the presence of oxidizing and reducing agents. Such a normal primer mixture, consisting of the previously described components with oxidizing and reducing agents is less suitable as a propellant charge for training systems. In contrast to the prior art, the presence of reducing agents is avoided in the mixture according to the invention. Thus the other additives no longer act as oxidizing agents.

For all types of weapons, the kinetic energy of the projectile can be varied over wide limits by varying the formulation of the propellant charge according to the invention. In that way, the excessive acceleration of the practice projectile described initially can be avoided.

The impact-sensitive propellant charges according to the invention can be made up in ordinary priming caps. But then the priming caps do not serve to ignite a propellant powder; rather, they themselves are the gas-generating material. Then, for example, the priming caps that contain the propellant charges according to the invention can be ignited by a primary priming cap.

The impact-sensitive propellant charges according to the invention can contain 5% to 70%, preferably 10% to 65% heavy-metal-free priming compound; mixtures of such heavy-metal-free priming compounds can also be used according to the invention. The friction agents according to the invention can be used in proportions of from 30% to 95%, preferably 35% to 80%; mixtures of these friction agents can also be used according to the invention.

Propellant charges of any desired strengths can be produced by varying the composition of the mixture.

The following positive observations were made:
- no aerosol production;
- no weapon erosion because of the soft friction agent;
- nevertheless, adequate friction action;
- smooth adjustment of power possible.

The following examples are presented (percentages are by weight):

Power:	Weak	Moderate	Strong
Potassium dinitrobenzofuroxanate	20%	40%	50%
Tetrazene	0%	10%	15%
Soft friction agent	80%	50%	35%

The propellant charges according to the invention can be used in training weapons systems.